CS and 30 percent DW-10 percent DW sequences, respectively, than for those fed the CS starter diet. The pigs fed the dried whey diet sequences, however, had weight advantages over those fed corn-soybean meal diet. The dollar values of these weight advantages were calculated by combining a value for fewer days in facilities and a value for the feed to produce the weight advantage. The last row in Table 3 shows these advantages to be positive. Therefore, in this experiment, it was cost-effective to use starter diets that included dried whey.

Pigs in the experiment were managed "all-in-all-out." They experienced no diarrhea and they averaged about 14 lb body weight initially. Under other environmental conditions and with lighter or heavier starting weights, the results might have been different.

Summary

1. Slight numerical, but not statistically significant, advantages in ADG and G/F resulted from inclusion of dried whey in starter diets.
2. There was no evidence that the slower growing pigs fed the corn-soybean meal starter diet made "catch-up" growth in the grower period.
3. The weight advantages of pigs fed starters containing dried whey were cost effective.

Determination of Optimum Levels of Inclusion of Spray-dried Porcine Plasma in Diets for Weanling Pigs Fed in Practical Conditions

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Introduction

Our group has previously reported on inclusion of spray-dried porcine plasma (SDPP) in conventional diets for weanling pigs. Inclusion of SDPP in those diets resulted in an increased average daily gain (ADG) and average daily feed intake (ADFI), particularly for the first 2 wk and decreased diarrhea scores for the overall period of the experiments (4 wk). Similar results have been obtained by researchers at Kansas State and Oklahoma State. In earlier experiments, the SDPP inclusion rate was set arbitrarily at 10 percent of the diet. Our group also reported on determination of optimum levels of SDPP inclusion (ISU Swine Reports 1990). The results of that study indicated that maximum ADG, ADFI, and gain/feed ratio (G/F) were achieved at an inclusion rate of 6 percent of SDPP. Because the maximum levels of performance were achieved with a lower inclusion rate than that previously used, these results seemed interesting from the economical point of view. However, our previous experiment was of limited size and it was conducted in a highly controlled environment. Therefore, we conducted a larger experiment with the objective of verifying those results under conditions that resembled more those of a commercial production unit.

Materials and Methods

Ninety-six, 4-wk-old pigs averaging 13.4 lb initial body weight were randomly assigned to six dietary treatments. The diets, which are reported in Table 1, consisted of a basal corn-soybean meal-dried whey diet to which graded levels of SDPP were added and adjustments in corn and soybean content were made to achieve similar levels of energy and lysine. The levels of inclusion of SDPP were: 0, 2, 4, 6, 8 and 10 percent. The diets were identical to the ones used in earlier work. But in this experiment, a 10 percent inclusion rate was added in order to confirm the quadratic responses seen in the previous experiment. The diets were fed for the first 2 wk of the experiment, after which pigs were transferred to a common corn-soybean meal-dried whey diet for the last 2 wk of the experiment. Because the pigs had some diarrhea, the antibiotic in the diet was changed for the last 2 wk to one more effective against the diarrhea. Pigs were penned in 4 x 4 ft. flat-deck pens, with four pigs per pen. Feed and water were provided *ad libitum*. Temperature was kept between 75° and 80°F. The criteria measured were ADG, ADFI and G/F ratio.

Results

The results of this experiment are reported in Table 2. They are reported in three time periods: the first 2 wk, the last 2 wk in which pigs were fed a common diet, and the total 4 wk of the experiment.

For the first 2 wk, increasing levels of SDPP caused ADG to increase linearly ($P<.04$) and quadratically ($P<.03$). For the same time period, ADFI increased quadratically ($P<.008$).

For the last 2 wk, in which pigs were fed a common diet, previous dietary treatment did not influence ($P<.05$) any of the

performance criteria studied.

For the overall period (1 through 4 wk), ADG increased quadratically ($P<.06$) as SDPP levels were increased in the diet. G/F ratio increased linearly ($P<.04$) to increasing levels of SDPP.

Discussion

The quadratic responses of performance criteria to concentrations of SDPP in the diet are indicative of maximum responses being reached at an intermediate SDPP concentration and then decreases in performance. Calculation of the maximum responses from the quadratic equations, where statistically significant, indicate that ADG in weeks 1 and 2, ADG in the 4-week period, and ADFI in weeks 1 and 2 were each maximized with about 6 percent SDPP in the diet.

The results of this experiment are in quite good agreement with those of a similar study reported last year *(1990 Swine Research Report, ISU)*.

Table 1. Composition of experimental diets

Item	SDPP, %						
	0	2	4	6	8	10	wk 3+4
Corn	45.75	47.60	49.68	51.74	53.76	55.73	45.75
Soybean meal	28.80	24.90	20.75	16.63	12.55	8.50	28.80
Dried whey	20.00	20.00	20.00	20.00	20.00	20.00	20.00
SDPP	--	2.00	4.00	6.00	8.00	10.00	--
Soy oil	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Calcium carbonate	.83	.80	.77	.73	.69	.71	.83
Dicalcium phosphate	1.01	1.09	1.19	1.29	1.39	1.45	1.01
Salt	.25	.25	.25	.25	.25	.25	.25
Trace mineral premix[a]	.10	.10	.10	.10	.10	.10	.10
Vitamin premix[b]	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Antibiotic[c]	.25	.25	.25	.25	.25	.25	.25
Ethoxyquin	.01	.01	.01	.01	.01	.01	.01
Calculated analysis:							
ME[d], kcal/lb	1510	1510	1507	1502	1498	1481	1510
Crude protein, %	19.82	19.57	19.20	18.84	18.50	18.42	19.82
Lysine, %	1.20	1.20	1.20	1.20	1.20	1.20	1.20
Methionine, %	.32	.31	.29	.28	.27	.25	.32
Sodium, %	.33	.33	.44	.54	.64	.76	.33

[a]Contributed in ppm of diet: Zn, 150; Fe, 175; Mn, 60; Cu, 17.5; I 2.0.

[b]Contributed per lb of diet: 2,000 IU vitamin A, 500 IU vitamin D_2, 3 g panthotenic acid, 15 mg niacin and 4.5 ug vitamin B_{12}.

[c]Contributed per lb of diet: 50 mg chlortetracycline, 50 mg sulfathiazole and 23 mg penicillin (1+2 wks); 3.5 mg neomycin (3+4 wks).

[d]Metabolizable Energy.